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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,284	11/16/2001	Clive A. Randall	823.0106USU	5378

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EXAMINER

FIORILLA, CHRISTOPHER A

ART UNIT

PAPER NUMBER

1731

6

DATE MAILED: 02/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/993,284

Applicant(s)

RANDALL ET AL.

Examiner

Christopher A. Fiorilla

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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1. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the phrase "such as" (see step c) renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 10,12,13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanei et al. (5,503,787).

Tanei et al. discloses a multilayer ceramic article with alternating piezoelectric ceramic (zirconia – col. 7, line 12) layers and base metal layers (i.e. copper). Tanei et al. also discloses that the residual carbon content from removed binders is less than 200ppm (see abstract).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1,3,4,5,6,7,8,10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanei et al. (5,503,787) in view of Hiramatsu et al. (6,489,257) and Tani et al. (5,981,069).

Tanei et al. teaches the basic claimed process of preparing a ceramic multilayer device. The process disclosed by Tanei et al. includes the steps of:

providing a first layer including a piezoelectric ceramic (col. 7, line 12 – zirconia) material and a combination of organic materials (col. 2, lines 63-67);

applying onto the first layer a second layer which includes a base metal powder and a second combination of organic materials (col. 3, line 19) to produce a first structure;

applying onto said first structure a second structure which is identical to said first structure to produce a multilayer structure (col. 5, lines 21-23);

heating the multilayer structure at a temperature less than 600°C to remove said organic materials and their decomposition products to levels below 200 ppm (col. 3, line 59); and

sintering at a temperature from about 600°C to about 1050°C in a reducing atmosphere to produce the multilayer device (col. 4, lines 37-50).

Hiramatsu et al. defines a reducing atmosphere for sintering ceramic materials as including an amount of oxygen which lies within the claimed range (see col. 7, lines 5-10). It would have been obvious to one having ordinary skill in the art at the time of the invention to use

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this type of atmosphere in the process of Tanei et al. in view of the generic requirement therein of a reducing atmosphere.

Tani et al. discloses coating copper particles with an oxidation resistant coating to provide fired conductors with improved properties. It would have been obvious to one having ordinary skill in the art at the time of the invention to use this type of conductor material in the process of Tanei et al. to obtain a sintered product with improved conductors.

The claimed organic materials (i.e. binder, solvent, dispersant, plasticizer) are conventional additives used in molding ceramic components. It would have been obvious to one skilled in the art at the time of the invention to use these conventional additives in the process of Tanei et al. in view of the generic disclosure therein to obtain the desired process parameters.

7. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (5,716,481) in view of Tanei et al. (5,503,787).

Kobayashi et al. discloses a multilayer piezoelectric device including alternating layers of piezoelectric ceramic material (col. 1, line 14-15 and col. 8, line 22) and base metal material (e.g. nickel col. 1, line 21 and col. 16, line 20).

Kobayashi et al. does not disclose that the organics are removed to leave less than 200 ppm decomposition products.

Tanei et al. discloses removing organics from a molded multilayer article such that the decomposition products that remain are below 200 ppm. It would have been obvious to one skilled in the art at the time of the invention to eliminate the organics of Kobayashi et al. to this level to reduce defects and thus improve the properties of the final product by making the product more homogeneous.

8. Claims 2 and 9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wada et al. is cited of interest to teach zirconia as a piezoelectric material. See col. 1, line 30.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher A. Fiorilla whose telephone number is 703-308-0674. The examiner can normally be reached on M-F, 6:30am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 703-308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

A handwritten signature in black ink, appearing to read 'ca Fiorilla', with a stylized flourish at the end.

**Christopher A. Fiorilla**  
**Primary Examiner**  
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